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Dinsmore & Shohl
1900 Chemed Center
255 East Fifth Street
Cincinnati, OH 45202

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COUNTS, GARY W	
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RECORD OF ORAL HEARING

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte IB MENDEL-HARTVIG, LENA VINTERBACK,
ANN JONSSON and JORGEN GUSTAFSSON

Appeal 2007-4450
Application 09/582,808
Technology Center 1600

Oral Hearing Held: December 18, 2007

Before TONI R. SCHEINER, DEMETRA J. MILLS, and ERIC B. GRIMES
Administrative Patent Judges.

ON BEHALF OF THE APPELLANTS:

Holly Koslowski, Esq.
Dinsmore & Shohl
1900 Chemed Center
255 East Fifth Street
Cincinnati, Ohio 45202

The above-entitled matter came on for hearing on Tuesday, December 18, 2007, at The U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia, before Sean Williams, Reporter.

MS. BOBO-ALLEN: Calendar Number 6, Appeal Number 2007-4450, Ms. Koslowski.

JUDGE SCHEINER: Good morning.

MS. KOSLOWSKI: Good morning.

JUDGE SCHEINER: I just wanted to let you know that we have an observer here --

MS. KOSLOWSKI: Okay.

JUDGE SCHEINER: So whenever you're ready, you have 20 minutes.

MS. KOSLOWSKI: Okay, I'll start right in. In this application there are two independent claims that are on appeal; Claim 42, which is a method for detecting an analyte (ph.) in a sample; and Claim 63, which is a test kit for performing analytical methods. Both the method and the test kit employ a flow matrix and use bio-specific affinity reactions in order to detect an analyte. There are two important features of both the method and the test kit.

First, they both employ a flow matrix, having a detection zone in which there is firmly anchored the bio-specific affinity reactant, which is also commonly referred to as the capturer. Additionally, both the method and the test kit employ an analytically detectable reactant, which is also referred to as the reactant asterisk, which -- in the detection zone. I'm sorry, it's captured in the detection zone. In terms of novel features of both the method and the test kit, there's a combination of three novel features which allow this, both the method and the test kit, to perform in an improved manner. First is that the detectable reactant has labeled particles as the analytically detectable group.

Second, the capturer is anchored to the matrix by immobilized particles, which exhibit hydrophilic groups on their surface. And third, the particles which anchor the capturer have a diameter which is smaller than a smallest inner-dimension of the flow channels of the flow matrix and do not interfere with the detection of the analytically detectable reactant in the detection zone.

The combination of these three features provides improved detection sensitivity, particularly for allergy tests where there can be employed a complex mixture of antigens, which oftentimes have overlapping compatibility for antibodies in a sample that's to be tested. As you know, projections based on a combination of references, as in this case, cannot be sustained by mere conclusory statements. Instead, there must be some articulated reasoning with rational underpinning to support the legal conclusion of obviousness. Demonstrating that each element was independently known in the art is not sufficient. Rather, it's important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed invention does.

The examiner has relied on a main combination of references, Charleton (ph.) being the primary reference, Batts (ph.) and Brown being secondary references, which do not satisfy this requirement. As I'll explain in more detail, Batts is not properly combinable with the primary reference along the lines asserted by the examiner or in any other manner, and Brown, even if combined along the lines asserted by the examiner, does not disclose the claim limitations which the examiner cites it for. Okay.

Charleton, which is the primary reference, discloses a test cell

with an interior permeable material capable of transporting an aqueous solution. So it does have a flow matrix of some type. The Charleton reference is particularly directed to over-the-counter assay test kits. They talk about facilitating the use of the test kits by consumers. Particularly, it's directed to HCG testing for pregnancy testing. It uses latex particles in order to immobilize a reactant for detecting this reaction. The latex particles are polystyrene particles, typically, and Charleton discloses that these particles are entrapped or otherwise fixed in the flow path with immobilized protein on their surface. However, there are two main deficiencies in the teachings of Charleton. First, Charleton does not disclose that those latex particles have any hydrophilic groups on their surface or that hydrophilic groups are used to bind with the protein that's used as one of the reactants. The present specification admits that the use of polystyrene latex particles in a flow matrix is old. In fact, polystyrene latex particles are preferred or had been preferred in the past.

JUDGE SCHEINER: Ms. Koslowski.

MS. KOSLOWSKI: Yes.

JUDGE SCHEINER: Could you stop just for a second? Did you just say that the -- it doesn't disclose that the captured protein is immobilized on the --

MS. KOSLOWSKI: With the use of hydrophilic groups.

JUDGE SCHEINER: Okay.

MS. KOSLOWSKI: It's missing the teaching of the hydrophilic groups, which are employed in the present application. And the present specification admits that the use of polystyrene latex particles, along the lines of what Charleton discloses, is old and in fact, it has been preferred in

the prior art because polystyrene latex particles tend to be hydrophobic, they're well-absorbed onto flow matrixes, such as nitrocellulose, so you've got a nice hydrophobic/hydrophobic relationship going on there and that's primarily why polystyrene latex particles have been used so much in the past and probably employed by Charleton.

JUDGE MILLS: And your claims don't exclude a nitrocellulose flow matrix --

MS. KOSLOWSKI: No. In fact, that's probably one of our preferred matrixes. It's -- the nitrocellulose matrix has become very common in most of the point-of-care diagnostic kits that employ flow matrixes, so in fact, you know, one of the commercial embodiments would employ that type of nitrocellulose hydrophobic matrix. So Charleton does not disclose the use of hydrophilic groups on those particles.

Also, it does not provide any teaching that the particles have a diameter smaller than the smallest inner dimension of the flow channels of the flow matrix. There really isn't any teaching in Charleton between the relationship between the size of the particles and the size of the flow channels in their permeable material. The examiner has relied on Batts as teaching hydrophilic latex particles. Batts is an interesting reference because it's primarily concerned with polymerization for preparing particles. Batts notes that in the past, emulsifiers that are used on polymerization for forming particles, typically the emulsifiers tend to leech out of the particles during use and interfere with reactions. So the focus of Batts is to produce latex particles in the absence of emulsifier in order to avoid that later leeching out of the emulsifier.

Batts goes on to disclose the use of their hydrophilic latex

polymer particles in solution amino acid assay techniques and they talk about the fact that these particles can be centrifuged and subjected to all the processing in solution amino assay techniques without disturbing the binding between the particles and the reactant, which is bound to the particles.

Importantly, Batts does not disclose that those particles can be used in combination with any type of other solid substrate and particularly can be absorbed on a flow matrix, as is employed in Charlton and in the present invention. That's an important distinction because the examiner has taken a position that it would be -- I think what he said was in the realm of one of ordinary skill in the art or obvious to ordinary skill in the art, to substitute the latex particles of Batts for the latex particles of Charleton, and I think that's incorrect, because as I noted, Charleton employs those hydrophobic polystyrene latex particles and there's a reason for doing that. You have that nice hydrophobic/hydrophobic relationship between the particles and the substrate.

It would not be apparent that hydrophilic particles or particles having hydrophilic groups would be able to be properly absorbed into a hydrophobic flow matrix and then have the reactant available for reacting with an analyte, which is in a sample, applied to the flow matrix and flows through the flow matrix. So it's like taking an oil/oil mixture and saying that it would be obvious to put water in there rather -- in place of one of the oils. You're really talking about two different characteristics of materials, which the polystyrene is chosen based on that hydrophobic/hydrophobic relationship.

JUDGE SCHEINER: Do I understand that you're -- in your

example and maybe some -- using nitrocellulose hydrophobic, but does the claim, Claim 42, does that require a hydrophobic flow zone?

MS. KOSLOWSKI: No, it doesn't. It does say, though, that the bio-specific affinity reactant, the capturer is firmly anchored --

JUDGE SCHEINER: Right.

MS. KOSLOWSKI: -- in the flow matrix.

JUDGE SCHEINER: And that that is hydrophilic -- particles at a time.

MS. KOSLOWSKI: Right, and that it goes on to --

JUDGE SCHEINER: Capture --

MS. KOSLOWSKI: Exactly, exactly. That those particles actually have the hydrophilic groups.

JUDGE SCHEINER: And that you don't necessarily have the hydrophobic/hydrophilic combination that you're talking about now, in this claim?

MS. KOSLOWSKI: That's right. The substrate is not required in the main claim to be hydrophobic. Although -- of course, in the Charleton examples, again, they do employ the polystyrene, the hydrophobic particles.

JUDGE SCHEINER: Okay.

MS. KOSLOWSKI: Let's see. And so the first deficiency of Charleton is the failure to disclose the hydrophilic groups on the particles. The second deficiency of Charlton is the failure to teach any relationship between the diameter size and -- the diameter size of the particle and the smallest inner dimension of the flow channel. So again, Batts is relied upon by the examiner, improperly, I believe, for a teaching of hydrophilic latex

particles. There's still no teaching not only of using those particles in a solid support, but if they were combined with a solid support of flow matrix along the lines of Charleton, there's no teaching or suggestion of that relationship in terms of size.

In the present specification, we discuss the importance of that size in combination with the hydrophilic groups on the particles and that these things together provide the improvements. The examiner then relies on Brown as teaching the deficiency that we have alleged in Charleton in terms of the size relationship between the particles, which are anchoring the reactant, and the size of the flow channels.

Interestingly, what Brown discloses is -- comes right out and says the size of the particles is not critical as long as the average diameter of the particles is substantially within the afore stated range, although it is preferred that the average diameter of the particles be smaller than the average pore size of the fibrous matrix. Any type of particles having the foregoing properties is suitable for use. There's a reference range of 0.1 to 10 microns without really any indication as to the average pore size of the fibrous matrix, which is employed in Brown. The examiner first asserted that that disclosure is what we're claiming and that's actually in error, because what the claims recite is that the particles have a diameter smaller than a smallest inner dimension of the flow channels of the flow matrix, so all of the particles are going to be smaller than the flow channels of the matrix.

What Brown teaches, first, is that the size of the particles isn't critical and then that the average diameter is substantially -- I'm sorry. The average diameter of the particles is preferably smaller than the average pore

size of the matrix. As you know, particle sizes can vary. Talking about an average size doesn't really teach or suggest the limitation that we're reciting in that all of the particles are smaller than the smallest dimension of the channels in the flow matrix.

In -- I believe it's maybe the examiner's answer, the examiner responded to that argument and asserted that it would be obvious to optimize a result effect variable so it would be obvious to arrive at the claimed limitation that's not taught by Brown. The problem with that is that Brown does not teach that particle sizes result effective. Particularly, Brown says that the particle size is not critical and then goes on to talk about average sizes. There really isn't any teaching or suggestion in there for one of ordinary skill in the art to even think about optimizing a particle size versus the smallest dimension of the flow matrix. So the examiner's assertion of optimizing a result effective variable really is not appropriate in this case. It's not disclosed as a result effective variable and there's no indication that the absolute sizes are relevant. However, in our invention, we believe that those are and the reason that limitation is in the claim is because it combines with the hydrophilic characteristic on the hydrophilic groups on the particles to allow the use of those hydrophilic group containing particles in the flow matrix and still get good testing results. I'll take a breath. Do you have any questions at this point?

JUDGE SCHEINER: Your molecule, it does have a hydrophobic portion still, that would attach to the -- nitrocellulose. It has a hydrophilic portion and the hydrophobic portion or is that --

MS. KOSLOWSKI: That's possible. That's possible. Some of that depends on the amount of hydrophilic groups that are on the particles,

but it's necessarily -- it's not necessary and the reason for that is the interplay between that hydrophilic characteristics in the groups on the particles and the fact that these particles are smaller than the flow channel size.

JUDGE GRIMES: You said that the example in Charleton used the nitrocellulose paper --

MS. KOSLOWSKI: Actually, I meant to say that it uses a polystyrene latex. I'd have to double check and see exactly what --

JUDGE GRIMES: As the flow matrix.

MS. KOSLOWSKI: What this flow matrix is.

JUDGE GRIMES: My question can be is there a disclosure in Charleton that says that you have to use a hydrophobic matrix?

MS. KOSLOWSKI: I don't believe there is. I think there is a bit of a general disclosure as to what the materials are. Yeah, in the example of Charleton, I think they're actually using glass fiber paper.

JUDGE GRIMES: And is that hydrophobic or hydrophilic?

MS. KOSLOWSKI: I'm not positive. I would venture that it is -- has hydrophobic tendencies and that's why they're using the polystyrene latex particles.

JUDGE SCHEINER: Could you point us to the part of Brown -- I'm sure it's in your brief, but the part of Brown that talks about particle size not being critical and --

MS. KOSLOWSKI: Yeah, at Column 9, beginning -- well, at Line 11 is where they say the size of the particles is not critical. They start talking about the particles actually in the -- at Column 8, Line 52 and then that paragraph --

JUDGE SCHEINER: It does say it's not critical as long as --

MS. KOSLOWSKI: Right.

JUDGE SCHEINER: -- the average diameter.

MS. KOSLOWSKI: Right, right. And again, they're talking -- I'm sorry.

JUDGE SCHEINER: You do get the sense that the particles are supposed to fit down into the pores and be physically entrapped?

MS. KOSLOWSKI: Right, right.

JUDGE SCHEINER: At least some of the particles.

MS. KOSLOWSKI: Yeah. Yeah, there's definitely a teaching that the average diameter of the particles be smaller than the average pore size of the fibrous matrix. That's clear. But we're not talking, in our claims, about average sizes. We are saying that the particles are smaller than the smallest dimension of the flow matrixes.

JUDGE SCHEINER: I understand that. What I'm looking at is whether the concept of -- some, at least some of the particles being able to physically fit down in the pores is identified as the result of that --

MS. KOSLOWSKI: Um-hum.

JUDGE SCHEINER: That's what I'm looking at here.

MS. KOSLOWSKI: Um-hum. And I think you make a good point that that -- that's generally known in the art, that the particles -- some of the particles have to be able to fit into the pores, otherwise it doesn't really make sense to use a flow matrix, particles in the flow matrix.

JUDGE SCHEINER: Right.

JUDGE MILLS: You had argued separately to some of the claims with regard to different hydrophilic groups. Did you have any other arguments. --

MS. KOSLOWSKI: Sure, sure. And that really applies with respect to Batts, which, in the polymerization of those particles that's done in the absence of an emulsifier. They use an epoxide monomer, which has a carbon/carbon reactive double bond so that then the final particles have epoxy groups. There are two claims in -- which are on appeal, which define the hydrophilic groups and exclude the epoxide groups.

JUDGE MILLS: And the examiner provided no evidence of any other kind of hydrophilic bonding with those other types of groups?

MS. KOSLOWSKI: I don't believe so. That's with respect to Claims 47 and 68, which were argued as independently patentable from the main rejection or the independent claims and the main rejection. I'll just conclude by saying that there are a number of additional rejections that the examiner has made of various dependent claims. In each of those rejections, the examiner applies a different reference for an isolated teaching.

I think our appeal brief discusses the isolated teachings of those references and the inappropriateness of picking and choosing elements from the various prior art and also emphasizes that point in the reply brief. Again, I think it's important to note that in all of these references I think the examiner has failed to recognize that in the art there is a difference between solution amino assay techniques and techniques which employ a flow matrix. Okay, thank you very much for your time.

JUDGE SCHEINER: Thank you. Did you have a question?

JUDGE MILLS: No, no more questions. Thank you.

(Whereupon, the proceedings concluded.)